CLAIMS

What is claimed is:

1. A process for examining of membrane enclosed biocompartments (1), wherein the biocompartments (1) are made ready in a micro-flow chamber (2) which is subject to through-flow of a culture medium containing an agent which can affect the biocompartments (1), the medium being in contact with the biocompartments (1) and wherein the pH value of that portion of the culture medium which is found within the micro-flow chamber (2) is measured, comprising:

a) indirectly measuring a concentration of a substance in a portion of a culture medium, the substance being released by and/or consumed by metabolic action into and/or from a portion of a culture medium contained in an activity area of the biocompartment (1), while between an operating electrode (19) placed in the activity area and a reference electrode (20) separated from said operating electrode (19), an electrical potential is applied to the culture medium (1) so that hydroxyl ions or hydrogen ions are formed from the substance in the culture medium;

b) at a measuring location in the portion of the culture medium, during the application of the said electrical potential, measuring at least a first measured value (pH_{-1}, pH_{-3} or pH_{+1}, pH_{-3}) for a pH value of the culture medium;

c) subsequently switching off or changing the electrical potential so that the formation of hydroxyl and hydrogen ions from the substance is stopped.

d) shortly before or after measurement of the first measurement values, (pH_{-1}, pH_{-3} or pH_{+1}, pH_{+3}), upon switching off electrical potential, or in the case of existing potential, or by a potential under which the formation of hydroxyl and hydrogen ions from the said substance is repressed, taking at least one second measurement value, namely (pH_{-2}, pH_{-4} or pH_{+2}, pH_{+4}) for the pH value of the culture medium;

e) calculating a difference from the first measurement value (pH_{-1}, pH_{-3} or pH_{+1}, pH_{+3}) and from the second measurement values (pH_{-2}, pH_{-4} or pH_{+2}, pH_{+4}),

(ΔpH_{-21}, ΔpH_{-43} or ΔpH_{+21}, ΔpH_{+43});

f) repeating the steps a) to e) at least once;

g) from the difference between at least two of these measured value differences, (ΔpH_{-21}, ΔpH_{-43} or ΔpH_{+21}, ΔpH_{+43}) determining a concentration change of the substance in the culture medium, and from the difference between at least two of the first measured pH values (pH_{-1}, pH_{-3} or pH_{+1}, pH_{+3}) and/or the second measured pH values (pH_{-2}, pH_{-4} or pH_{+2}, pH_{+4}) determining the acidification or the alkalinization of the culture medium; and

h) from the so acquired measurement values for the concentration change and the acidification or the alkalinization, determining the metabolic activity of the biocompartments (1).

2. A process in accordance with Claim 1, wherein the sequence comprised of the steps a) to g) is run through at least twice, and that in accordance with this repetition, the electrical polarity applied between the operational electrode (19) and the reference electrode (20) is selected on a changeable basis.

3. A process in accordance with Claim 1, wherein a time for the measurement of the pH measured values (pH_{-1}, pH_{-2}, pH_{-3}, pH_{-4}, or pH_{+1}, $pH_{+2}pH_{+3}$, pH_{+4}) is adjusted to coincide with a time at which the electrical potential is changed or switched off, and the hydrogen ion and hydroxy ion concentrations in the culture medium are generally in balance.

4. A process in accordance with Claim 1, wherein a time interval between the respective times of the application, the switching off or change in the electrical potential,

and the subsequent time in which a pH measurement value (pH_{-1}, pH_{-2}, pH_{-3}, pH_{-4}, or pH_{+1}, pH_{+2} pH_{+3}, pH_{+4}) is measured, are approximately the same at all pH measurement values (pH_{-1}, pH_{-2}, pH_{-3}, pH_{-4}, or pH_{+1}, pH_{+2} pH_{+3}, pH_{+4}).

5. A process in accordance with Claim 1, wherein the electrical potential is switched off, or, in accordance with Step c, is changed, before an equilibrium state of the hydrogen and hydroxyl ion concentrations has established itself in the culture medium.

6. A process in accordance with Claim 1, further comprising measuring the flowing electric electrode current between the operational electrode (19) and the reference electrode (20).

7. A process in accordance with Claim 1, wherein the biocompartments (1) are installed in such a manner on the operational electrode (19), that, area-wise, they partially cover the electrode (19) and that from the applied voltage between the operational electrode (19) and the reference electrode (20) on the electrode current, the morphology of the biocompartments (1) can be determined.

8. A process in accordance with Claim 1, wherein the through-flow of the culture medium is halted or at least reduced during and between the times of acquiring of the first and last pH measurement values of the measured pH value series for a determination of a concentration change of the substance in the culture medium and the acidification or the alkalinization thereof.

9. A process in accordance with Claim 1, wherein between the determination of the first and last pH measurement values of the pH value series of measurements, the buffer capacity of the culture medium is held constant.